

0570
0717

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OIPE

ENTERED

RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/991,209

DATE: 07/18/2002

TIME: 11:13:03

Input Set : A:\GC648-2-seqlist.txt

Output Set: N:\CRF3\07182002\I991209.raw

4 <110> APPLICANT: Dunn-Coleman, Nigel
 5 Langdon, Timothy
 6 Morse, Phillip
 8 <120> TITLE OF INVENTION: Manipulation of the Phenolic Acid
 9 Content and Digestibility of Plant Cell Walls by Targeted
 10 Expression of Genes Encoding Cell Wall Degrading Enzymes
 13 <130> FILE REFERENCE: GC648-2
 15 <140> CURRENT APPLICATION NUMBER: US 09/991,209
 C--> 16 <141> CURRENT FILING DATE: 2002-07-02
 18 <150> PRIOR APPLICATION NUMBER: US 60/249,608
 19 <151> PRIOR FILING DATE: 2000-11-17
 21 <160> NUMBER OF SEQ ID NOS: 97
 23 <170> SOFTWARE: FastSEQ for Windows Version 4.0
 25 <210> SEQ ID NO: 1
 26 <211> LENGTH: 2436
 27 <212> TYPE: DNA
 28 <213> ORGANISM: Aspergillus niger
 30 <400> SEQUENCE: 1

31	ccatggtggt	gtcgatatcg	gcagtagtct	ttgccgaaac	gttgaggggt	acagtgatct	60
32	gcgtcggaca	tacttcgggg	aatctacggc	ggaatatcaa	agtcttcgga	atatccatat	120
33	tgggaaagga	cagaagctcc	ggggtagttt	gatagatgag	ctccgggtga	ttaaatecggg	180
34	agctgacagg	agtgagcgtc	atgtagacca	tctagtaatg	tcagtcgcgc	gcaatttcgc	240
35	acatgaaaca	agttgatttc	gggaccccat	tgttacatct	ctcggctaca	gctcgagatg	300
36	tgcttgccga	gtatacttag	aagccatgcc	agcgtgttgt	tatacgacca	aaagtcaggg	360
37	aatatgaaac	gatcgtcgga	tatttcttgt	ttttatccta	aattagtctt	ccagtggttt	420
38	atttaagaga	tagatccctt	cacaaacact	catccaacgg	acttctcata	ccactcattg	480
39	acataatttc	aaacagctcc	aggcgcatct	agttcaacat	gaagcaattc	tccgccaaac	540
40	acgtcctcgc	agttgtggtg	actgcagggc	acgccttagc	agcctctacg	caaggcatct	600
41	ccgaagacct	ctacagccgt	ttagtcgaaa	tgcccaactat	ctcccaagct	gcctacgccg	660
42	acctgtgcaa	cattccgtcg	actattatca	agggagagaa	aatttacaat	tctcaaactg	720
43	acattaacgg	atggatcctc	cgcgacgaca	gcagcaaaga	aataatcacc	gtcttcctgt	780
44	gcactggtag	tgatacgaat	ctacaactcg	atactaacta	cacctcacg	ccttcgaca	840
45	ccctaccaca	atgcaacggt	tgtgaagtac	acggtggata	ttatattgga	tgggtctccg	900
46	tccaggacca	agtcgagtcg	cttgtcaaac	agcagggttag	ccagtatccg	gactatgcgc	960
47	tgactgtgac	gggccacagg	tatgccctcg	tgatttcttt	caattaagtg	tataatactc	1020
48	actaactcta	cgatagtctc	ggagcgtccc	tggcagcact	cactgccgcc	cagctgtctg	1080
49	cgacatacga	caacatccgc	ctgtacacct	tccgcgaacc	gcgcagcggc	aatcaggcct	1140
50	tcgcgtcgta	catgaacgat	gccttccaag	cctcgagccc	agatacgacg	cagtatttcc	1200
51	gggtcactca	tgccaacgac	ggcatcccaa	acctgcccc	ggtggagcag	gggtacgccc	1260
52	atggcggtgt	agagtactgg	agcgttgatc	cttacagcgc	ccagaacaca	tttgtctgca	1320
53	ctggggatga	agtgacgtgc	tgtgaggccc	agggcgagaca	gggtgtgaat	aatgcgcaca	1380
54	cgacttattt	tgggatgacg	agcggagcct	gtacatggtg	atcagtcatt	tcagcctccc	1440
55	cgagtgtacc	aggaaagatg	gatgtcctgg	agagggcatg	catgtacgta	taccggaagc	1500

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```

56 acactttttc ggtaaatcag gacatgtaat aagttccttc catgaataga tatggttacc 1560
57 ctcaccataa gccttgaggt tgcctttctc ttttgattgt gaatatatat ttaaagtaga 1620
58 tgacagatat ctctaaacac cttatccgct taaacccatc atagattgtg tcacgtgata 1680
59 gaccccttga atgatgagcg aaatgtatca gtcccgttta aatcaaacc tttcagccta 1740
60 gcacagtcag aatacaccaa ccccatctta aggtagtact aaatatgaat acagcctaaa 1800
61 tgcacgcta tatgatccca taaagaagca acaacctttc agatctcggt ttgcgctgcg 1860
62 aagagctagc tctaccatgg tctcaattat gagtggagcg tttagtctcg ttttagccta 1920
63 gctatcttat aaggacaaca catgtacatg ggcttacttg tagagaggta ggatcccggg 1980
64 cttcttcaca tctcgaggag ttgtctacac gtcgcgtcca tgcataagc cggtagctga 2040
65 cggtgtcggt accgtgaccc agacccctgt tgatagcggt gagaaggccc tatatttgaa 2100
66 tttccaatct cagctttacg aagatatgcc catggtggag ggtagtaaa ccgatgatga 2160
67 tcgtgtgcag catgagatga gaccgtggcc aatcctgttc aaatgccaa acccgccctcc 2220
68 taccacatgt aaggcatccg tcggccgcac gttgaattgt gcaaatgcc agatcataaa 2280
69 agcggccaca cttccacgtc ggtactggat gggttgcgcg tggccatact gtgttttcca 2340
70 ttgcgtgggt cggtcgtgtt actgcgacgc agattctgta ggcaaggcgc agggctctct 2400
71 tctgaggtag aaaacacccc atattaatct gaattc 2436

```

73 <210> SEQ ID NO: 2

74 <211> LENGTH: 281

75 <212> TYPE: PRT

76 <213> ORGANISM: *Aspergillus niger*

78 <400> SEQUENCE: 2

```

79 Met Lys Gln Phe Ser Ala Lys His Val Leu Ala Val Val Val Thr Ala
80 1 5 10 15
81 Gly His Ala Leu Ala Ala Ser Thr Gln Gly Ile Ser Glu Asp Leu Tyr
82 20 25 30
83 Ser Arg Leu Val Glu Met Ala Thr Ile Ser Gln Ala Ala Tyr Ala Asp
84 35 40 45
85 Leu Cys Asn Ile Pro Ser Thr Ile Ile Lys Gly Glu Lys Ile Tyr Asn
86 50 55 60
87 Ser Gln Thr Asp Ile Asn Gly Trp Ile Leu Arg Asp Asp Ser Ser Lys
88 65 70 75 80
89 Glu Ile Ile Thr Val Phe Arg Gly Thr Gly Ser Asp Thr Asn Leu Gln
90 85 90 95
91 Leu Asp Thr Asn Tyr Thr Leu Thr Pro Phe Asp Thr Leu Pro Gln Cys
92 100 105 110
93 Asn Gly Cys Glu Val His Gly Gly Tyr Tyr Ile Gly Trp Val Ser Val
94 115 120 125
95 Gln Asp Gln Val Glu Ser Leu Val Lys Gln Gln Val Ser Gln Tyr Pro
96 130 135 140
97 Asp Tyr Ala Leu Thr Val Thr Gly His Ser Leu Gly Ala Ser Leu Ala
98 145 150 155 160
99 Ala Leu Thr Ala Ala Gln Leu Ser Ala Thr Tyr Asp Asn Ile Arg Leu
100 165 170 175
101 Tyr Thr Phe Gly Glu Pro Arg Ser Gly Asn Gln Ala Phe Ala Ser Tyr
102 180 185 190
103 Met Asn Asp Ala Phe Gln Ala Ser Ser Pro Asp Thr Thr Gln Tyr Phe
104 195 200 205
105 Arg Val Thr His Ala Asn Asp Gly Ile Pro Asn Leu Pro Pro Val Glu
106 210 215 220

```

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```

107 Gln Gly Tyr Ala His Gly Gly Val Glu Tyr Trp Ser Val Asp Pro Tyr
108 225                230                235                240
109 Ser Ala Gln Asn Thr Phe Val Cys Thr Gly Asp Glu Val Gln Cys Cys
110                245                250                255
111 Glu Ala Gln Gly Gly Gln Gly Val Asn Asn Ala His Thr Thr Tyr Phe
112                260                265                270
113 Gly Met Thr Ser Gly Ala Cys Thr Trp
114                275                280
116 <210> SEQ ID NO: 3
117 <211> LENGTH: 40
118 <212> TYPE: DNA
119 <213> ORGANISM: Artificial Sequence
121 <220> FEATURE:
122 <223> OTHER INFORMATION: funcional PCR product reading frame
124 <400> SEQUENCE: 3
125 ggactacgcg ctgaccgtga ccggccactc cctcggcgcc                40
127 <210> SEQ ID NO: 4
128 <211> LENGTH: 35
129 <212> TYPE: DNA
130 <213> ORGANISM: Artificial Sequence
132 <220> FEATURE:
133 <223> OTHER INFORMATION: inactivated PCR product reading frame
135 <400> SEQUENCE: 4
136 ccggccacgc cctcggcgcc tccctggcgg cactc                35
138 <210> SEQ ID NO: 5
139 <211> LENGTH: 10
140 <212> TYPE: PRT
141 <213> ORGANISM: Artificial Sequence
143 <220> FEATURE:
144 <223> OTHER INFORMATION: retention sequence
146 <400> SEQUENCE: 5
147 Ala Ala Ala Glu Pro Leu Lys Asp Glu Leu
148 1                5                10
150 <210> SEQ ID NO: 6
151 <211> LENGTH: 33
152 <212> TYPE: DNA
153 <213> ORGANISM: Artificial Sequence
155 <220> FEATURE:
156 <223> OTHER INFORMATION: retention sequence encoding sequence
158 <400> SEQUENCE: 6
159 gcggccgcgg aaccactgaa ggatgagctg taa                33
161 <210> SEQ ID NO: 7
162 <211> LENGTH: 15
163 <212> TYPE: PRT
164 <213> ORGANISM: Artificial Sequence
166 <220> FEATURE:
167 <223> OTHER INFORMATION: FAE-linker-frameshift sequence
169 <400> SEQUENCE: 7
170 Gly Ala Cys Thr Trp Pro Val Ala Ala Ala Glu Thr Thr Glu Gly

```

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Input Set : A:\GC648-2-seqlist.txt

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```

171 1 5 10 15
173 <210> SEQ ID NO: 8
174 <211> LENGTH: 48
175 <212> TYPE: DNA
176 <213> ORGANISM: Artificial Sequence
178 <220> FEATURE:
179 <223> OTHER INFORMATION: FAE-linker-frameshift sequence
181 <400> SEQUENCE: 8
182 ggcgcacatgca cctggccggt cgcggccgcg gaaaccactg aaggatga 48
184 <210> SEQ ID NO: 9
185 <211> LENGTH: 41
186 <212> TYPE: PRT
187 <213> ORGANISM: Hordeum sp.
189 <400> SEQUENCE: 9
190 Met Ala His Ala Arg Val Leu Leu Leu Ala Leu Ala Val Leu Ala Thr
191 1 5 10 15
192 Ala Ala Val Ala Val Ala Ser Ser Ser Ser Phe Ala Asp Ser Asn Pro
193 20 25 30
194 Ile Arg Pro Val Thr Asp Arg Ala Ala
195 35 40
197 <210> SEQ ID NO: 10
198 <211> LENGTH: 134
199 <212> TYPE: DNA
200 <213> ORGANISM: Hordeum sp.
202 <400> SEQUENCE: 10
203 aagcttacca tggccacgc ccgcgtcctc ctcttgccgc tcgccgtgct ggccacggcc 60
204 gccgtcgccg tcgcctcctc ctctctcctc gccgactcca acccgatccg gcccgtcacc 120
205 gaccgcgcgg ccgc 134
207 <210> SEQ ID NO: 11
208 <211> LENGTH: 46
209 <212> TYPE: PRT
210 <213> ORGANISM: Rattus sp.
212 <400> SEQUENCE: 11
213 Met Ile His Thr Asn Leu Lys Lys Lys Phe Ser Leu Phe Ile Leu Val
214 1 5 10 15
215 Phe Leu Leu Phe Ala Val Ile Cys Val Trp Lys Lys Gly Ser Asp Tyr
216 20 25 30
217 Glu Ala Leu Thr Leu Gln Ala Lys Glu Phe Gln Met Ala Ala
218 35 40 45
220 <210> SEQ ID NO: 12
221 <211> LENGTH: 149
222 <212> TYPE: DNA
223 <213> ORGANISM: Rattus sp.
225 <400> SEQUENCE: 12
226 aagcttacca tgatccacac caacctcaaa aagaagttct cctcttcat cctcgtcttc 60
227 ctctctctcg ccgtgatctg cgtgtggaag aagggtccg actacgaggc cctcaccctc 120
228 caagccaagg agttccaaat ggcggccgc 149
230 <210> SEQ ID NO: 13
231 <211> LENGTH: 50

```

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Input Set : A:\GC648-2-seqlist.txt

Output Set: N:\CRF3\07182002\I991209.raw

```

232 <212> TYPE: PRT
233 <213> ORGANISM: Solanum sp.
235 <220> FEATURE:
236 <221> NAME/KEY: VARIANT
237 <222> LOCATION: (1)...(50)
238 <223> OTHER INFORMATION: Xaa = Any Amino Acid
240 <400> SEQUENCE: 13
W--> 241 Met Xaa Val His Lys Glu Val Asn Phe Val Ala Tyr Leu Leu Ile Val
      242   1             5             10             15
      243 Leu Gly Leu Leu Leu Leu Val Ser Ala Met Glu His Val Asp Ala Lys
      244             20             25             30
W--> 245 Ala Cys Thr Xaa Glu Cys Gly Asn Leu Gly Phe Gly Ile Cys Pro Ala
      246             35             40             45
      247 Ala Ala
      248       50
250 <210> SEQ ID NO: 14
251 <211> LENGTH: 159
252 <212> TYPE: DNA
253 <213> ORGANISM: Solanum sp.
255 <400> SEQUENCE: 14
256 aagcttacma tggmctgca caaggaggts aacttcgtsg cctacctcct gatcgtsctc      60
257 ggctctctct tgcctgtstc cgccatggag cactgtggacg ccaaggcctg caccckcgag      120
258 tgcggcaacc tcggcttcgg catctgcccg gcggccgcc      159
260 <210> SEQ ID NO: 15
261 <211> LENGTH: 5338
262 <212> TYPE: DNA
263 <213> ORGANISM: Artificial Sequence
265 <220> FEATURE:
266 <223> OTHER INFORMATION: pTP10-1 vector
268 <400> SEQUENCE: 15
269 aagcttacca tggccacgc ccgcgtcctc ctccctgggc tgcgcgtgct ggccacggcc      60
270 gccgtcgccg tcgcctcctc ctccctcctc gccgactcca acccgatccg gcccgtcacc      120
271 gaccgcgcgg ccgcctccac gcagggcacg tccgaagacc tctacagccg tttagtcgaa      180
272 atggccacta tctcccaagc tgcctacgcc gacctgtgca acattccgtc gactattatc      240
273 aaggagagaga aaatttacaa ttctcaaaact gacattaacg gatggatcct ccgcgacgac      300
274 agcagcaaaag aaataatcac cgtcttccgt ggcaactggt gtgatacgaa tctacaactc      360
275 gatactgact acaccctcac gcccttcgac accctaccac aatgcaacgg ttgtgaagta      420
276 caggtgggat attatattgg atgggtctcc gtccaggacc aagtcgagtc gcttgtcaaa      480
277 cagcaggtta gccagtatcc ggactacgcg ctgaccgtga ccggccackc cctcggcgcc      540
278 tccctggcgg cactcactgc cggccagctg tctgcgacat acgacaacat ccgcctgtac      600
279 accttcggcg aaccgcgcag cggcaatcag gccttcgcgt cgtacatgaa cgatgccttc      660
280 caagcctcga gccagatac gacgcagtat ttccgggtca ctcatgccaa cgacggcatc      720
281 ccaaacctgc ccccggtgga gcaggggtac gcccatggcg gtgtagagta ctggagcggt      780
282 gatccttaca gcgcccagaa cacatttgct tgcactgggg atgaagtgca gtgctgtgag      840
283 gccagggcg gacagggtgt gaataatgcg cacacgactt attttgggat gacgagcggc      900
284 gcatgcacct ggccggtcgc ggccgcggaa accactgaag gatgagctgt aaagaagcag      960
285 atcgttcaaa catttggaac taaagtttct taagattgaa tcctgttgcc ggtcttgcca      1020
286 tgattatcat ataatttctg ttgaattacg ttaagcatgt aataattaac atgtaatgca      1080
287 tgacgttatt tatgagatgg gtttttatga ttagagtcgc gcaattatac atttaatacg      1140

```

RAW SEQUENCE LISTING ERROR SUMMARY
PATENT APPLICATION: US/09/991,209

DATE: 07/18/2002
TIME: 11:13:04

Input Set : A:\GC648-2-seqlist.txt
Output Set: N:\CRF3\07182002\I991209.raw

Please Note:

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

Seq#:13; Xaa Pos. 2,36
Seq#:16; Xaa Pos. 174
Seq#:18; Xaa Pos. 160
Seq#:20; Xaa Pos. 174
Seq#:22; Xaa Pos. 174
Seq#:24; Xaa Pos. 174
Seq#:26; Xaa Pos. 154
Seq#:28; Xaa Pos. 82
Seq#:30; Xaa Pos. 174
Seq#:39; Xaa Pos. 160
Seq#:40; N Pos. 939
Seq#:42; Xaa Pos. 174
Seq#:48; N Pos. 939

VERIFICATION SUMMARY

DATE: 07/18/2002

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Input Set : A:\GC648-2-seqlist.txt

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L:16 M:271 C: Current Filing Date differs, Replaced Current Filing Date
L:241 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:13 after pos.:0
L:245 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:13 after pos.:32
L:367 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:371 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:16
L:392 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:16 after pos.:160
L:521 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:525 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:18
L:544 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:18 after pos.:144
L:670 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:674 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:20
L:695 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:20 after pos.:160
L:824 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:828 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:22
L:849 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:22 after pos.:160
L:975 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:979 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:24
L:1000 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:24 after pos.:160
L:1127 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:1131 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:26
L:1150 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:26 after pos.:144
L:1278 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:1282 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:28
L:1293 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:28 after pos.:80
L:1419 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:1423 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:30
L:1444 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:30 after pos.:160
L:2231 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:2235 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:39
L:2254 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:39 after pos.:144
L:2283 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:2287 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:40
L:2303 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:40 after pos.:900
L:2481 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:2485 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:42
L:2506 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:42 after pos.:160
L:2633 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:2637 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:48
L:2653 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:48 after pos.:900